

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

Claims 1-15 (Canceled).

Claim 16 (Currently Amended): A method for depositing wear-resistant coatings on metal surfaces of machine components and articles to improve service life of parts and to reshape geometrical size of parts during repair, said method comprising the following steps:

- (i) providing an ion-plasma deposition chamber;
- (ii) locating as an anode said machine components or articles being treated inside said ion-plasma deposition chamber;
- (iii) locating in said chamber cathodes made from the Group IVB-VIB metals and/or alloys thereof;
- (iv) establishing in said chamber a gas atmosphere wherein the gas is selected from the group consisting of inert or non-inert gases and mixtures thereof;
- (v) effecting, whenever necessary, ion cleaning of surfaces of said machine components or articles;
- (vi) effecting selective ion-plasma deposition of at least three layers of a coating, wherein:

at least one layer (a) consists of said metals, mixtures thereof or substitution alloys, said at least one layer having a thickness of 0.02-5 microns,

a second layer (b) consists of interstitial solid solutions of nonmetallic atoms of nitrogen, carbon, and boron in said Group IVB-VIB metals, said second layer having a thickness of 0.4-10 microns, and

a third layer (c) consists of chemical compounds of interstitial phases of said Group IVB-Group VIB metals with nonmetals in the form of nitrides, carbides, borides and mixtures thereof, said third layer having a thickness of .1-12.5 microns, wherein said first second and third layers have thickness ratios of about 1:2:2.5 respectively;

(vii) subjecting one or more of said layers to treatments by implanting thereinto non-metallic ions simultaneously with the step of effecting ion-plasma deposition, said non metallic ions selected from the group consisting of argon, nitrogen, carbon or boron ions; and

(viii) cooling and unloading said machine components or articles from said chamber.

Claim 17 (Previously Presented): A method as claimed in claim 16, characterized in that after having been cooled and

unloaded said machine components or articles are subjected to vibromechanical treatment with pellets.

Claim 18 (Original): A method as defined in claim 16, wherein said machine components or articles are made from titanium, titanium alloys, steels or nickel-based alloys.

Claim 19 (Previously Presented): A method as defined in claim 16, wherein said cathodes are titanium alloys which after deposition form a composition similar to the base material of a machine component or article.

Claim 20 (Previously Presented): A method as defined in claim 16, wherein there are from 3-500 layers, and said layers (a), (b), (c) alternate successively.

Claim 21: Canceled.

Claim 22 (Previously Presented): A method as defined in claim 16, further comprising the step of depositing a first layer consisting of scandium, yttrium or other rare earth metal having a thickness of 0.02 to 0.08 micron before step (vi).

Claim 23 (Previously Presented) A method as defined in claim 16, wherein the gas atmosphere is nitrogen, acetylene, methane or diborane.

Claim 24 (Previously Presented): A method as defined in claim 16, wherein said step of ion deposition is effected with ions of argon, or nitrogen, or carbon, or boron at an accelerating voltage of 10-50 kV, at a radiation dose of 10^{14} - 10^{18} ion/sq.cm. and an energy of ions of 5×10^3 - 1×10^5 eV.

Claim 25 (Previously Presented): A method as defined in claim 16, wherein said ion-plasma deposition step (vi) comprises the steps of depositing:

- (a) a scandium layer in an argon atmosphere;
- (b) a titanium layer in an argon atmosphere;
- (c) a layer comprising a solid solution of implanted nitrogen ions in titanium in an atmosphere comprising a mixture of nitrogen and argon;
- (d) a layer comprising titanium nitride implanted with nitrogen ions in nitrogen atmosphere;
- (e) a zirconium layer in argon atmosphere;

(f) a layer comprising a solid solution of implanted nitrogen ions in zirconium in an atmosphere comprising a mixture of nitrogen and argon;

(g) a layer comprising zirconium nitride implanted with nitrogen ions in nitrogen atmosphere; and

(h) the step of repeating said steps (b-g) in that order to provide a desired number of layers.

Claim 26 (Previously Presented): A method as defined in claim 16, wherein said deposition step (vi) comprises depositing:

(a) a first layer comprising alloys of titanium and zirconium in an inert gas atmosphere;

(b) a layer comprising alloys of titanium and zirconium implanted with nitrogen atoms in an atmosphere of a mixture of said inert gas and nitrogen;

(c) a layer comprising titanium and zirconium nitrides implanted with nitrogen ions in nitrogen atmosphere;

(d) repeating said steps (a) -(c) to provide a desired number of layers to form a multilayer coating; and

(e) implanting argon ions into the multilayer coating.

Claim 27 (Previously Presented): A method as defined in claim 26, wherein said deposition step (vi) comprises depositing:

- (a) a layer of titanium and zirconium alloys in an inert gas;
- (b) alloys of titanium and zirconium with boron in a mixture of an inert gas with diborane;
- (c) titanium and zirconium borides implanted with boron;
- (d) repeating said steps (a)-(b) in that order to provide a desired number of layers to form a multilayer coating; and
- (e) implanting argon ions in the multilayer coating.

Claim 28 (Currently Amended): A coating of metal surfaces, comprising deposited on said surfaces by ion-plasma deposition process at least three layers, said at least three layers comprising the following:

at least one first layer consisting of Group IVB-VIB metals, a mixture thereof or substitution alloys, said layer having a thickness of 0.02-5 microns,

at least one second layer consisting of interstitial solid solutions of nonmetal atoms of nitrogen, carbon, boron in said Group IVB-VIB metals, said second layer having a thickness of 0.4-10 microns,

at least one third layer of chemical compounds of interstitial phases of said Group IVB-VIB metals with nonmetals in the form of nitrides, carbides, borides and mixtures thereof, said layer having a thickness of .1-12.5 microns, wherein said first second and third layers have thickness ratios of about 1:2:2.5 respectively,

wherein implanted in at least one of any of said layers are non metal ions selected from the group consisting of argon, nitrogen, carbon or boron ions.

Claim 29 (Original): Machine components and articles deposited by the method as claimed in claim 16.

Claim 30 (Original): Machine components and articles having a coating according to claim 28.